

XXI. *New Species of North American Tortricidæ.* By
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LL.D., F.R.S., etc.

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PLATE XII.

THE following species are for the most part described from collections made by the late H. K. Morrison in Arizona and N. Carolina, and Mr. W. G. Smith at Loveland in Colorado; 18 out of 26 are figured. I am by no means convinced that these few descriptions exhaust the number of the undescribed species received from them, but especially in the genus *Pædisca* the local varieties have so strong a tendency to overlap according to the latitude in which they are taken that we meet in an accentuated form the ever-recurring difficulty of deciding what is a distinct species and what may be regarded as a mere variation from some already described northern or southern type.

I have for this reason selected those only which are obviously distinct in their characters, and which at least in the absence of any long series of connecting links cannot possibly be confounded with their Californian or other allies.

Had I been less strictly bound by this rule I could certainly have made known several additional variations in colour and markings which might well have claimed specific distinction, but which for the moment I have preferred to regard as strongly marked varieties of species already known to science. I am indebted to my friend, Dr. Fernald, for his advice and assistance in more than one instance, but even his high authority and sanction have not given me the courage to include in the present list all those species which he regarded as undescribed.

The paper has been somewhat expanded since the plate was put in hand, a further collection made by

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Mr. Smith in the same locality having been received through the kindness of the Honble. Walter Rothschild. I regret that it is impossible to add illustrations to the plate, which leaves several types to be figured at some future time. A few corrections have been made in the nomenclature of the genera, as in the case of *Hysterosia* for *Idiographis*, *Zeiraphera* for *Steganoptycha*, and *Eucelis* for *Grapholitha*, the reasons for which will be found fully set forth where these names occur. I am painfully aware that these few corrections touch the fringe only of a subject uncongenial to my taste, but if any consistent method is to be introduced into the system of nomenclature finally adopted for general use by students of this and allied groups of Lepidoptera, it is a subject that must be boldly faced and placed once for all upon a sound basis. I have here endeavoured merely to indicate the lines upon which such an attempt can safely be made.

TORTRICIDÆ.

TORTRICINÆ.

PLATYNOTA, Clem.

Platynota nigrocervina, sp. n.

Antennæ, ♂, cinereous. *Palpi* cinereous, speckled with fuscous. *Head* and *Thorax* cinereous, with some fuscous shading. *Forewings*, ♂, fawn-ochreous, with a broad broken band of blue-black scales (some in raised tufts) extending from before the middle of the costal to beyond the middle of the dorsal margin; a similar band, but somewhat more mixed with the fawn ground-colour, begins beyond the costal margin and joins the first band about the lower angle of the cell; one or two transverse fawn-coloured streaks cross the apical portion of the wing to the anal angle, and above it and between these, as well as among the broken spaces in the dark bands, some lines of shining steel scales illuminate the paler ground-colour; cilia pale fawn, a slender reduplicated darker line along their base. *Exp. al.*, ♂ 20 mm. *Hindwings* reddish fawn; cilia grey, with a darker dividing shade near their base. *Abdomen* fawn ochreous. *Legs* fawn whitish.

♀ In the larger female the black bands are reduced to incon-

spicuous fawn-brown shades containing a few tufts of raised scales in which black is very sparsely represented. *Exp. al.*, ♀ 23 mm.

Type. ♂ ♀. Mus. Wlsm. (*Paratypes*, Tring Mus.)

Hab. Colorado—Larima Co., 5000 feet, July–August, 1891 (Smith).

Allied to *Platynota flavedana*, Clem.

Platynota metallicana, sp. n. (Pl. XII., fig. 1.)

Antennæ biciliate (2); ochreous, clothed at the base with ferruginous scales. *Palpi* very long; reddish ferruginous. *Head* ferruginous. *Thorax* ferruginous, mixed with ochreous. *Forewings* thickly covered with patches of rich ferruginous and ochreous raised scales, the interspaces between them shining metallic whitish ochreous; a rich shining lilac streak occupies the outer half of the discal cell and is diffused outward and downward toward the anal angle; there is also a lilac reflection about the patches of raised scales which form an irregular oblique fasciaform band from before the middle of the costa to the anal angle; a second shining lilac band leaves the costal margin at its outer fourth and curving slightly outwards is attenuated to the anal angle, this is narrowly margined by slightly raised lines of rich ferruginous and ochreous scales, two whitish ochreous metallic lines lying beyond it, the first adjacent to it, the second along the apical margin; cilia shining golden. *Exp. al.*, ♂ 16 mm., ♀ 19 mm. *Hindwings* rich tawny ferruginous; cilia golden, with a ferruginous dividing line near their base. *Undersides* uniformly rich reddish orange with golden cilia. *Abdomen* ferruginous, mixed with ochreous at the sides. *Legs* ochreous, externally tinged with ferruginous.

Type. ♂ ♀ Mus. Wlsm.

Hab. Florida. Three males and one female, the latter unfortunately much broken, but somewhat larger than the male, received from the late Mr. Morrison. It is difficult to describe in words the rich colour, combinations and metallic effects which distinguish this very beautiful and remarkable species, it can scarcely be regarded as closely allied to any other of the genus.

PHALONIANÆ.

PHALONIADÆ, Meyr. = CONCHYLINÆ, Fern.

HYSTEROSIA, Stph.

Hysterosia, Stph. List Br. An. B.M. X. Lp. 85 (1852);
 Wlsm. Ent. Mo. Mag. XXXI., 42 (1895); = *Idio-*
graphis, Ld. Wien. Ent. Mts. III., 242, 246 (1859);
 Fern. Tr. Am. Ent. Soc. X., 23 (1882).

Hysterosia aureoalbida, sp. n.

Antennæ, ♂, white above, greyish beneath. *Palpi and Head* white. *Thorax* very pale golden yellow. *Forewings*, ♂, shining silvery white, with a very pale golden yellow suffusion which is divided into oblique transverse bands beyond the middle; three or more coppery-red spots, one beneath the fold at one-third from the base, consisting of only a few scattered scales above the dorsal margin, near the outer end of the fold partially connected by a line of scales with a more conspicuous spot at the upper angle of the cell, a smaller spot lying half-way between this and the apex; these spots are all ill-defined (in some specimens consisting merely of groups of coppery-red scales, and in some almost entirely disappearing); cilia white, with a slight golden tinge. *Exp. al.*, ♂ 17 mm. *Hindwings* whitish, tinged with lilac-grey; cilia shining white. *Abdomen* greyish.

The ♀ is very different in colour from the ♂, the general effect is pale fawn-ochreous, the shining whitish ground showing only between the scattered patches of this colour and in transverse oblique bands across the apical portion of the wing. *Exp. al.*, ♀ 16 mm. The palpi, which are very sharp in the ♂, are somewhat shorter and more obtuse in the ♀, and together with the head, thorax, and antennæ, are pale fawn-ochreous. The hindwings are also a little darker.

Type. ♂ ♀. Mus. Wlsm.

Hab. Colorado—Loveland, 5–10,000 ft. July, 1891 (Smith).

Allied to *Hysterosia ægrana*, Wlsm.

PHALONIA, Hb. (Meyr.).

= *CONCHYLIS*, Tr. (Fern.)

Phalonia felix, sp. n. (Pl. XII., fig. 2.)

Antennæ biciliate in the male (1); pale cinereous. *Palpi* whitish internally, reddish fawn externally. *Head* creamy white. *Thorax* whitish, the tegulæ shaded with reddish fawn. *Forewings*

elongate, slightly widened outwardly, costal margin straight, apical margin oblique, apex rounded; creamy white, with some shining white scales and rosy fawn-brown markings; the costal margin shaded with rosy fawn to beyond the middle, more widely at the base, this colour is diverted from the middle of the costal margin obliquely backward, but almost obliterated on the cell forming an indistinct fasciaform band which terminates in an oblique quadrate ferruginous spot, resting widely on the dorsal margin, reaching to the fold and narrowly margined with black on both sides, a small black spot lying beyond it at the commencement of the dorsal cilia; a fawn-brown shade, leaving the costal margin at its outer fourth, curves outwards and reverts parallel to the apical margin in the direction of the anal angle, and contains a patch and line of black scales below its middle; this is preceded and followed by sinuous broken bands of silvery white, the outer one ending in a fork before the apex; apical margin narrowly fawn-brown with some ferruginous scales; cilia mottled throughout with pale rosy fawn and blue-grey scales, which at the apex are darker than towards the anal angle. Underside leaden grey, the costal margin narrowly rosy fawn, with white and grey speckling towards the apex. *Exp. al.*, 20 mm. *Hindwings* pale grey; cilia whitish grey. Underside paler than in the forewings, with darker reticulations on the outer half. *Abdomen* fawn-grey. *Legs* greyish, the tarsi banded with fawn-brown.

Type. ♂♀. Mus. Wlsm.

Hab. Colorado—Loveland, 5,000–10,000 ft., July 1891 (several specimens—Smith).

This species is allied to the European *Conchylis hilarana*, H.-S.

PHTHEOCHROA, Stph.

Phtheochroa macrocarpana, sp. n. (Pl. XII., fig. 3.)

Antennæ cinereous. *Palpi* projecting three times the length of the head beyond it; creamy white. *Head* creamy white. *Thorax* grey, mottled with whitish. *Forewings* shining white, with grey bands; a broad grey basal patch, containing a few black scales at its outer edge, and some white about the base of the fold and on the dorsal margin, spreads obliquely outwards from the costa to the fold, thence reverting at an angle to the dorsal margin; an irregular central fascia of the same colour is indented before and behind at the upper edge of the cell and is less well defined on its

inner side near the dorsal margin than elsewhere, its edges being, for the most part, speckled with black and brown scales, of which there is also a large patch across its middle; beyond it, from the outer fourth, a cuneiform band divided by white on the costa, descends nearly to the anal angle ending in a point before reaching it, its somewhat sinuous edges defined by black and brown lines; the space about the apex, as well as between the markings described, is very faintly mottled with pale grey; cilia yellowish white. *Exp. al.*, 17 mm. *Hindwings* shining pale grey, delicately mottled throughout with darker grey; cilia shining greyish white. *Abdomen* shining greyish. *Legs* whitish, with a slight ochreous tinge.

Type. ♀. Mus. Wlsm.

Hab. California—Alameda Co., bred from seeds of *Cupressus macrocarpa*, 24th January, 1886. (Received from Dr. C. V. Riley, No. 46, 1886.)

OLETHREUTINÆ (*OLETHREUTÆ*, Hb.) Wlsm. emend.

= *GRAPHOLITHINÆ*, Fern. = *EPIBLEMIDÆ*, Meyr.

PENTHINA, Tr.

Penthina melanosticta, sp. n.

Antennæ greyish fuscous. *Palpi* black, with some white scales beneath. *Head* whitish, mixed with fuscous and ferruginous scales. *Thorax* black, the ends of the tegulæ white. *Forewings* white, with numerous black and blue-grey blotches mixed with some ferruginous scales, especially about the apex and apical margin; these blotches are distributed in an ill-defined basal patch extending to one-fourth (partially connected by greyish mottling with a broad central fascia, interrupted on vein 2), and also about the apex and more sparingly before and above the anal angle; there are three costal spots beyond the central fascia, a blue-grey spot beyond the end of the cell, and a short band of the same colour nearly parallel with the upper half of the apical margin; cilia dark greyish fuscous with a black line along their base and some white speckling at their outer extremities. *Underside* greyish fuscous, the outer half of the costal margin cream-white with three fuscous spots. *Exp. al.*, 24 mm. *Hindwings* brownish; cilia somewhat paler, with a dark dividing line near their base. *Underside* dirty whitish, the margins shaded with fuscous.

Abdomen blackish (possibly somewhat discoloured by grease), with a white transverse band behind the thorax. *Legs* whitish, with greyish fuscous tarsal bands.

Type ♀. Mus. Wlsm.

Hab. Colorado—Larima Co., 10,000 ft., July, 1891 (Smith).

Penthina duplex, sp. n. (Pl. XII., fig. 4.)

Antennæ cinereous. *Palpi* whitish; apical joint very short, grey. *Head* and *Thorax* whitish, the latter shaded with grey and having a slight tuft at the back mixed with brownish ochreous scales. *Forewings* with the costal margin evenly arched, apical margin slightly oblique; creamy white, with grey basal patch and central fascia, both studded with dark umber-brown scales; the basal patch is wider on the dorsal than on the costal margin, obtusely angulated outward on the fold; the central fascia, narrow on the costa, is dilated outwards beneath it, again contracted on the cell, and thence again dilated more widely to the dorsal margin; the more conspicuous patches of dark scales upon it are one on the cell, one at the lower edge of the fold, and one on the dorsal margin at its outer extremity near the anal angle; on the outer half of the costal margin are three greyish fuscous spots with minute specks of the same colour lying between them; the whole wing-surface beyond the fascia is overstrewn with delicate brownish ochreous scaling in the form of oblique transverse streaklets, not clearly defined, but giving a slight ochreous hue to the white ground-colour; some similar scaling may be seen on parts of the central fascia, and conspicuously in a semicircular spot at the extreme apex; a series of small greyish fuscous spots lies around the apical margin sending some dark scales through the white cilia, near the base of which is a dark, dividing line. *Exp. al.*, 27 mm. *Hindwings* umber brown; cilia shining whitish, with a dark dividing line. *Abdomen* brownish grey, the anal tuft inclining to ochreous. *Legs* pale cinereous.

Type. ♂. Mus. Wlsm.

Hab. Colorado—Loveland, 5,000–10,000 ft., July, 1891 (Smith).

A very large species not nearly allied to any other North American form known to me.

(Group SERICORIS, Tr.)

Penthina major, sp. n.

Antennæ greyish fuscous, spotted above with white. *Palpi* pale fawn, the apical joint fuscous. *Head* and *Thorax* fawn-grey. *Forewings* fawn-brown, speckled with pale ochreous, with two pale ochreous transverse fasciæ margined on both sides by shining silvery bands; the apex is mottled with pale ochreous preceded by an angulated silvery band; the first fascia is at one-third from the base, its inner margin slightly concave, its outer margin slightly bulging outwards on the cell; the second fascia leaving the costal margin beyond the middle runs obliquely to the anal angle, the silvery bands which bound it being deflected inwards to the dorsal margin from about the lower angle of the cell, a few fawn-brown spots along the costal margin encroach upon the upper edge of the pale fasciæ; cilia white, with some grey shading at their base, especially around the apex. *Exp. al.*, 23 mm. *Hindwings* fawn-grey, with whitish cilia. *Abdomen* greyish fuscous, anal tuft ochreous. *Legs* white.

Type. ♂. Mus. Wlsm.

Hab. Colorado—Loveland, 5,000–10,000 ft., 1891 (Smith).

Allied to *S. constellatana*, Z., but the silvery markings confined to the margins of the fasciæ, not scattered between them; it is also a larger and more distinctly marked species.

PÆDISCA, Tr.

Pædisca hyponomeutana, sp. n. (Pl. XII., fig. 12.)

Antennæ, ♂, biciliate ($\frac{1}{2}$), rather stout; white. *Palpi* moderately clothed, projecting slightly beyond the head; apical joint short, drooping; white. *Head* thickly clothed above and in front; creamy white. *Thorax* shining white, with two lateral black spots posteriorly; tegulæ with a few black scales across their middle. *Forewings* with the costal margin straight, apical margin slightly oblique, anal angle rounded; shining white sprinkled with distinct black angular spots to the number of about fifty; of these one only, at about one-sixth of the wing-length, is actually contiguous to the costal margin, others beyond, approach it very closely, but there is no apparent regularity in the arrangement of the spots, which are for the most part transversely elongate, a somewhat regular series of about ten extending from the base immediately below the fold; a second series of about six below it,

along the dorsal margin ; there is an elongate spot in the base of the cilia immediately below the apex, and a larger and more conspicuous one scarcely below the middle of the apical margin, the latter plainly visible on the underside ; cilia white, tipped at the apex with greyish fuscous. *Exp. al.*, 26 mm. *Hindwings* white, with a slight smoky brown shade, especially on their outer half ; cilia shining white. *Abdomen* white. *Legs* white, with a slight brownish tinge.

Type. ♂. Mus. Wlsm.

Hab. Colorado—Loveland. A single specimen of this very distinct species received from Mr. W. G. Smith in 1891.

Pædisca ragonoti, sp. n. (Pl. XII., fig. 9.)

Antennæ very slightly pubescent rather than ciliate ; white, slenderly annulated with mouse-grey. *Palpi* white, tinged with mouse-grey at the outer sides ; densely clothed to the apex. *Head* creamy white. *Thorax* white, slightly grey shaded. *Forewings* pale mouse-grey, with shining white blotches ; the extreme base narrowly shining white, as also the extreme edge of the dorsal margin near the base ; a pair of large irregular shining white spots on the basal third, obliquely placed, the first on the middle of the wing reaching to the lower edge of the costal fold, the second beyond and below it touching the dorsal margin ; a very oblique shining white band from below the costa, before the middle, crosses the wing obliquely, and is bent back at its outer extremity to the middle of the dorsal margin ; from near its outer angle a curved shining white streak bends outwards, reverting to the anal angle and throwing out a branch to the apical margin below the apex ; above this curved streak, on the outer half of the wing, is a quadrate subcostal shining white patch, branching obliquely outward to the costal cilia, a short shining white apical streak beyond it ; cilia white, with a mouse-grey shade running through them at the apex, and below the middle of the apical margin. Underside smoky grey, with three white costal spots towards the apex. *Exp. al.*, 23 mm. *Hindwings* pale fawn-grey ; cilia white, with a grey shade along their base. *Abdomen* fawn-grey. *Legs* greyish white.

Type. ♂ ♀. Mus. Wlsm.

Hab. Colorado—Loveland, 5,000 and 10,000 ft., July, 1891 ; several specimens (Smith):

Allied to *Pædisca bolanderana*, Wlsm.

Pædisca argenteana, sp. n. (Pl. XII., fig. 13.)

Antennæ biciliate in the ♂ (scarcely $\frac{1}{2}$); pale fawn. *Palpi* whitish, tinged with pale fawn-colour. *Head* and *Thorax* pale fawn, the latter with silvery white longitudinal streaks on either side of the middle. *Forewings* pale fawn-ochreous, with shining silvery white streaks longitudinally; one commencing near the base of the costal margin follows it to two-thirds of the wing-length, thence obliquely depressed towards the middle of the apical margin (without however reaching it), whence it is broken by lines of scattered brown scales into three longitudinal striæ, the lower one curving back to the lower extremity of the cell and there nearly meeting a conspicuous shining white streak which comes straight from the base along the cell; above the outer half of this latter lies a shorter parallel shining white streak; half-way between the fold and the dorsal margin is another shining white streak coming from the base and reaching to the commencement of the dorsal cilia; the extreme dorsal margin below it, and the outer half of the fold above it being also streaked with shining white, margined at its outer extremity by brown scales; on the costal margin before the apex is a semicircular shining white streak enclosing an ovate spot of the ochreous ground-colour; along the apical margin is a narrow shining white band, separated from the shining white cilia by a slender brown line. *Exp. al.*, 19 mm. *Hindwings* pale fawn-grey; cilia greyish white. *Abdomen* fawn-grey. *Legs* whitish.

Type. ♂. Mus. Wlsm.

Hab. Colorado—Loveland, 5,000–10,000 feet, July, 1891; eight specimens (Smith).

I find the markings of this species somewhat variable and frequently almost obliterated on the outer half of the wing. The description is taken from a very distinctly marked specimen.

Pædisca serpentana, sp. n. (Pl. XII., fig. 10.)

Antennæ white, annulated with pale mouse-grey. *Palpi* projecting fully the length of the head beyond it, the long hairs of the second outreaching the short apical joint; white, slightly shaded at the sides. *Head* white. *Thorax* creamy white. *Forewings* mouse-grey, speckled with whitish about the outer end of the cell, inclining to fawn ochreous around the edges of the shining white bands which traverse the wing-surface; the first of these

commences at the base below the costa, dilated outwards and bent downwards at one-third, terminating in an acute point about the middle of the wing, at its base it is diffused downwards across the fold, almost blending with a sinuous band of the same colour, commencing near the middle of the dorsal margin, thence looped outwards and upwards, reverting nearly to the anal angle and deflected towards the apex parallel with the apical margin; on the outer half of the costal margin are two short shining white festooned bands, the first deflected obliquely outward, the second equidistant between it and the apex; the apex, apical margin, and cilia are white, thickly speckled with grey scales. Underside with three or four pale costal spots beyond the middle. *Erg. al.*, 20 mm. *Hindwings* pale fawn-grey; cilia whitish. *Abdomen* and *Legs* creamy whitish.

Type. ♂. Mus. Wlsm.

Hab. Colorado—Loveland, 5,000–10,000 feet, July, 1891; four specimens (Smith). One specimen received from Morrison many years ago, also from Colorado.

Closely allied to *Pædisca morrisoni*, Wlsm.

Pædisca adamantana, Gn.

Argyroptera adamantana, Gn. Ind. Meth., 65 (1845);¹

Hdnrch. Lp. Eur. Cat. Meth., 66, No. 157 (1851).²

Conchylis adamantana, Wlgrn. Bih. Svensk. Vet. Ak., III., 13, No. 93 (1875).³ Ent. Tdsk., IX., 196 (1888);⁴ Rag. Ann. Soc. Ent. Fr., LXIII., 187–8,

Pl. I., 5 (1894).⁵

Type. Mus. Oberthür.

Hab. Lapland (?).^{1, 3, 4} North America.⁵

This appears to be a convenient opportunity for noticing a remarkable and very distinct species originally described by Guenée, who supposed that it had been collected in Lapland. M. Ragonot has recently re-described it from a North American specimen in his own collection which I have had the opportunity of examining. The precise locality is still unknown. It is undoubtedly a *Pædisca* with normal neuration and a distinct brown costal fold, and therefore, inadvertently placed by Ragonot in the genus *Conchylis*, although vein 2 of the forewings may be said to come from the commencement of the outer third of the cell. Its position would appear

to be near *Pædisca crambitana*, Wlsm., and it is an equally beautiful and remarkable form. We may hope that at some future time the number of known specimens (at present only three) may be increased.

[*Pædisca* (?) *norvichiana*, Hb.

Tortrix norvichiana, Hb. Samml. Eur. Schm., VII., Pl. XL., 252 (1814); *Eugnosta norvichiana*, Hb., Verz. bek. Schm., 394, No. 3832 (1826); *Argyroptera norvichiana*, Gn. Ind. Meth., 65 (1845); *Eupecillia norvichiana*, H.-S. Schm. Eur. IV., 179 (1849); *Argyroptera norvichiana*, Hdnrh. Lp. Eur. Cat., Meth., 66, No. 158 (1851).

Hab.?

I should like to call attention to *norvichiana*, Hb., the species which precedes *adamantana*, Gn., in the Index Methodicus, in regard to which Herrich Schäffer remarks, "vielleicht exotisch." Nothing appears to be known about this insect, nor is it mentioned in Staudinger and Wocke's Catalogue. A study of the figure leaves a strong impression upon my mind that it is a *Pædisca* allied to *adamantana*, nor should I be surprised to receive both species from some sub-arctic region.]

Pædisca smithiana, sp. n.

Antennæ white. *Head*, *Palpi*, and *Thorax* white. *Forewings* shining white (in some specimens with a slight yellowish tinge), some faint smoky grey lines and streaks in the ♀ are almost entirely obliterated in the ♂ specimen; these appear along the fold and around the margins of the cell, some also descending obliquely from the costal margin before the apex, whence also arise one or two silvery marks, extending downwards towards the ocelloid patch, which is margined before and behind with silvery white, preceded at its lower angle by a minute group of black scales, and contains two black dots; cilia white, profusely and minutely speckled with black. *Exp. al.*, 16 mm. *Hindwings* very pale whitish grey; cilia white. *Abdomen* very pale greyish. *Legs* white.

Type. ♂ ♀. Mus. Wlsm.

Hab. Colorado—Loveland, 5,000 ft., July, 1891 (Smith).

Nearly allied to *P. pergandeana*, Fernald MS., but

somewhat smaller and more shining in appearance, the ground-colour being more unmistakably white.

Pædisca biplagata, sp. n. (Pl. XII., fig. 7.)

Antennæ biciliate (less than $\frac{1}{2}$); very pale fawn, the basal joint, straw ochreous. *Palpi* projecting more than the length of the head beyond it; pale straw-ochreous, shaded along the sides with fawn-brown. *Head* and *Thorax* straw ochreous. *Forewings* rather wide, the costal margin very slightly arched, apical margin convex; pale straw ochreous with two small patches of fawn-brown scales, the first above the middle of the dorsal margin, pointing obliquely outwards, reaching to the lower edge of the cell; the second at the end of the cell, tending obliquely outwards, from near the costal in the direction of the apical margin above the anal angle; these patches are faintly outlined by shining white scales, extending towards the anal angle, but scarcely distinguishable from the pale ground-colour of the wing, in which there is a certain admixture of the same; cilia pale straw ochreous, tending to whitish on their outer half. *Exp. al.*, 24 mm. *Hindwings* pale reddish brown; cilia shining white. *Abdomen* whitish ochreous. *Legs* whitish.

Type. ♂. Mus. Wlsm.

Hab. Colorado—Loveland, 10,000 ft., July, 1891; two specimens (Smith).

Pædisca fuscosparsa, sp. n. (Pl. XII., fig. 8.)

Antennæ biciliate (more than $\frac{1}{2}$); pale cinereous. *Palpi* projecting the length of the head beyond it; whitish ochreous. *Head* brownish ochreous. *Thorax* whitish ochreous, the tegulæ spotted with greyish fuscous scales. *Forewings* moderately straight, not much widened outwardly; whitish ochreous, streaked and sprinkled with brownish fuscous scales, with a slight fawn-brown suffusion along the middle; the brownish fuscous scaling is more noticeable about the middle of the wing-surface where, in the type, it assumes the form of an ill-defined narrow band enclosing the outer portion of the cell and resting on the fold at either extremity; immediately below the costal margin are a number of small irregular brownish fuscous spots, and a line of these runs parallel to the apical margin at a short distance from it, preceding a few similar spots at the apex and along the margin itself; below the fold are also a few small brownish fuscous spots and the paler fawn-brown suffusion is also here somewhat noticeable; cilia whitish ochreous touched with fuscous at the edges. The forewings are pale margined on the underside, the pale costal band

distinctly dilated before the apex. *Exp. al.*, 28 mm. *Hindwings* tawny brown; cilia whitish, a brown dividing line near their base. *Abdomen* whitish cinereous, anal tuft whitish ochreous. *Legs* whitish.

Type. ♂. Mus. Wlsm.

Hab. Colorado—Loveland, 5,000–10,000 ft., July, 1891; two specimens (Smith).

In the second specimen, although both are in equally good condition, the markings are almost obliterated, neither the subcostal spots, the subapical line, nor the discal lines being at all clearly defined but consisting merely of a general distribution of brownish fuscous scales indicating their pattern and position which so far as it goes is the same as in the type.

A series received (from the same locality) since this description was written, exhibits considerable variation in the markings, some varieties approaching closely the narrower-winged *Pædisca mediotriata*, in these the median shade and transverse streaking become obsolete, the darker markings assuming the form of radiating streaks between the veins beyond and above the cell. In some specimens no markings whatever are apparent, the ground-colour becoming pale cream ochreous with merely some scattered fuscous scales dusted over the surface.

Pædisca mediotriata, sp. n. (Pl. XII., fig. 11.)

Antennæ biciliate (more than $\frac{1}{2}$); whitish. *Palpi* projecting more than the length of the head beyond it; fawn-grey, white on their inner sides. *Head* and *Thorax* fawn-grey, the ends of the tegulae paler. *Forewings* fawn-grey sprinkled with elongate blackish scales, the costal margin from near the base white, a broad median white streak from the base to the end of the cell is furcate at its apex, a second narrower white streak running parallel with it below the fold; from the end of the cell about six diffused ill-defined streaks radiate in the direction of the apex and apical margin, interspersed with blackish scales; cilia white. *Exp. al.*, 22 mm. *Hindwings* dark tawny brown; cilia white with a distinct brown line running through them near their base. On the under-side the wings are all distinctly pale margined, the pale costal band of the forewings being of equal width throughout. *Abdomen* creamy whitish. *Legs* whitish.

Type. ♂. Mus. Wlsm.

Hab. Colorado—Loveland, 5,000 ft., July, 1891; five specimens (Smith).

Pædisca invicta, sp. n.

Antennæ biciliate (1) in the male; greyish ochreous. *Palpi* fawn greyish at the sides, whitish above and beneath; the apical joint almost entirely concealed in closely appressed scales. *Head* fawn-brown. *Thorax* whitish, with a pale pink suffusion. *Forewings* white, mottled with pale leaden grey, except on a broad quadrangular medio-dorsal patch, the grey mottling is more concentrated around the margins of this patch and before the upper half of the apical margin than on the other parts of the wing; the quadrangular white dorsal patch has its inner edge almost straight, a narrow pale fawn-brown line studded with groups of black scales separating it from the grey mottled space which precedes it, its outer edge is somewhat angulated, reducing its width above the fold, here also it is bounded by a slender fawn-brown line and a series of black dots; the slight fawn-brown shade beyond it precedes a curved line of black dots indicating the inner margin of an obsolete ocelloid patch, and beyond this, parallel with the middle of the apical margin, are three or four small black lunules with some pale fawn-brown scaling which is repeated in an oval spot at the extreme apex; cilia rosy white, a grey line at their base around the apex, and three grey spots about the middle of the margin. *Exp. al.*, ♂ 30 mm.; ♀ 33.5 mm. *Hindwings* greyish fuscous; cilia white, with a dividing shade near their base. *Abdomen* greyish. *Legs* white.

Type. ♂ ♀. Mus. Wlsm. (*Paratypes*, Tring Mus.)

Hab. Colorado—Larima Co., 5,000 ft., July, 1891 (Smith).

The description is taken from an extremely fine and well-marked specimen, but two varieties occur which are at least worth mentioning: in both, the lines of black dots are obliterated and the grey mottling is much less distinguishable, in one the whole wing is suffused with rosy pink as in fine specimens of the European *Pædisca incarnatana*, Hb., in the other there is but the faintest indication of the darker markings, the white ground-colour prevailing throughout.

Pædisca (?) *carolinana*, sp. n. (Pl. XII., fig. 5.)

Antennæ finely ciliate; greyish fuscous. *Palpi* (broken). *Head* purplish fuscous, mixed with grey brown scales. *Thorax* purplish fuscous, posteriorly tufted with ferruginous and grey

scales. *Forewings* of approximately even width throughout, the costa slightly arched, the apical margin slightly sinuous not oblique, the anal angle rounded ; greyish white, with leaden grey spots and blotches ; a basal patch occupying nearly one-third of the wing, its outer edge serrate throughout, is composed of an equal admixture of black, leaden grey, brownish grey, ferruginous and whitish scales distributed in patches, more or less blending with each other ; the same colours are found in a series of scattered patches following the costal margin and distributed across the wing beyond the middle and towards the apex, the black prevailing in a broken quadrate patch resting on the dorsal margin before the anal angle and in a semicircular subapical spot, with some smaller spots below it, parallel to the margin, which is blotched with ferruginous, bounded inwardly by a sinuate white line, the white ground-colour appearing also in a series of about seven geminated costal streaks, commencing at the outer edge of the basal patch, and ending before the apex ; the cilia are for the most part brownish grey broken and mottled with white. *Exp. al.*, 25 mm. *Hindwings* brown ; cilia greyish white, with a brown dividing line. *Abdomen* brownish. *Hind legs* whitish cinereous, the tibiae thickly clothed with long scales, the tarsal joints banded with grey.

Type. ♀. Mus. Wlsm.

Hab. North Carolina (Morrison).

A conspicuous and very distinct species of the group allied to *scudderiana*, Clem., but surpassing that species in size and distinguished from its allies by the uniformly dark hindwings and rich mottling of the forewings.

Pædisca dilatana, sp. n. (Pl. XII., fig. 14.)

Antennæ very pale fawn colour. *Palpi* projecting more than twice the length of the head beyond it ; fawn-white, thickly dusted with fawn-brown on the outer sides. *Head* fawn-white, sparsely sprinkled with brownish scales. *Thorax* fawn-white, sprinkled with fawn-brown. *Forewings* somewhat narrow at the base, widened outwardly, the apex acute, the oblique apical margin slightly impressed beneath it, costal margin slightly rounded ; very pale (almost whitish) fawn with a pale fawn-brown basal patch, occupying fully one-third of the wing-length, narrower on the dorsal than on the costal margin, its outer edge very oblique and angulated below the costa ; a rounded dorsal patch of the same colour before the anal angle and a sinuous streak of varying width commencing on the cell and ending at the apex, the ground-colour

being at its palest immediately around the outer margins of these markings ; a few darker almost fuscous scales are sprinkled about the costal fold and apical streak and along the base of the cilia, which are fawn-brown tipped and sprinkled with white. *Exp. al.*, 26 mm. *Hindwings* pale fawn-brown; cilia somewhat lighter, with a slight dividing shade near their base and some faint whitish speckling. On the underside the hindwings are more decidedly lighter than the forewings. *Abdomen* and *Hindlegs* pale fawn.

Type. ♂. Mus. Wlsm.

Hab. Arizona (Morrison).

This species differs from *Pædisca dorsisignatana*, Clem., in its wider forewings, in the more outward position of the dorsal blotch and in the obliquely margined basal patch, although in general appearance it somewhat recalls a large specimen of that species.

I should like to add here that I cannot agree with Dr. Fernald in regarding *Pædisca graduatana* as a variety of *dorsisignatana*, the hindwings are more reddish-brown and the dorsal patch is much squarer and more upright than in that species of which I have a very long series presenting almost every possible grade of variation from the pale buff-coloured Californian specimens to the dark greyish fuscous varieties from N. Carolina.

Pædisca castaneana, sp. n. (Pl. XII., fig. 6.)

Antennæ pale cinereous, distinctly banded above with fuscous. *Palpi* (broken). *Head* chestnut brown; face white. *Thorax* chestnut brown, whitish posteriorly. *Forewings* shining white and bright chestnut brown in about equal proportions, the former occupying the central portion of the wing, the latter forming a strong basal patch with convex outer edge, broader on the dorsal than on the costal margin, a median costal blotch dilated and diffused outward and downward and overspreading the white ground-colour, with a slight chestnut tinge, to the anal angle, also forming two small costal spots beyond it, and covering the whole apical portion of the wing, except a reduplicated white costal streak before the apex; the bright chestnut apical patch throws out a strong projection on its inner edge above the middle; cilia rosy grey, with some blackish scales along their base below the middle of the apical margin. *Exp. al.*, 15 mm. *Hindwings* shining pale grey,

with a slight pinkish tinge; cilia pale yellowish grey, with a faintly indicated dividing line. *Abdomen* shining pale grey, anal tuft ochreous. *Legs* pale ochreous.

Type. ♂. Mus. Wlsm.

Hab. Colorado—Loveland, July, 1891 (Smith).

This species has the form and appearance of a *Steganoptycha* allied to *incarnatana*, Hw., but is at once distinguished by its straighter neuration and the distinct costal fold in the ♂.

SEMASIA, Stph.

Semasia bucephaloides, Wlsm. (Pl. XII., fig. 17.)

Semasia bucephaloides, Wlsm. Ins. Life, III., 465 (1891).

Type. ♀. Mus. Wlsm.

Hab. California—Little Shasta (Siskiyou Co.) September, 1871.

I take the opportunity of figuring this species, which was captured by myself in 1871, sitting on flowers of *Mentzelia lævicaulis*.

Semasia octopunctana, sp. n.

Antennæ cream-colour. *Palpi* cream-white. *Head* cream-white, slightly shaded with pale fawn at the sides. *Thorax* cream-coloured. *Forewings* cream-colour, with a reddish brown suffusion, except along the costal third of the wing; two bright oblique reddish brown transverse bands, the first at one-third from the base, nearer to the base on the costal than on the dorsal margin, where it blends on its inner side with the paler reddish brown suffusion which precedes it; the second arising on the middle of the costal margin, reaches the dorsal margin before the anal angle, sending outwards from its middle an angulated band which ends at the apex, a slender broken silvery line separating its upper edge from the elongate cream-coloured costal patch which fills the space above it; the ocelloid patch above the anal angle, bounded at each extremity by a silvery line, is cream-coloured, containing eight jet black spots in two parallel rows of four each; cilia hoary greyish. *Exp. al.*, 16 mm. *Hindwings* grey, with slightly paler cilia. *Abdomen* grey.

Type. ♂. Mus. Wlsm.

Hab. Colorado—Larima Co., 5,000 ft., May, 1891 (Smith).

Allied to *Semasia ochreicostana*, Wlsm.

Semasia ochrocephala, sp. n.

Antennæ greyish, the basal joint pale ochreous. *Palpi* whitish ochreous, with a brown spot on the outer side of the second joint. *Head* whitish ochreous. *Thorax* whitish ochreous, streaked with fawn-brown. *Forewings* whitish ochreous, much suffused with fawn-brown from the base to the ocelloid patch as high as the upper edge of the cell; some narrow oblique fawn-brown streaklets along the costal margin alternate with wider ones; an oblique patch of the same colour at about the middle of the margin connected with the dark suffusion below it, on this suffused portion are patches of greyish fuscous tending obliquely outwards from the basal third of the dorsal margin and reverting to it, beyond the middle; the ocelloid patch is pale yellowish ochreous margined by shining silvery bands and containing two black streaks; cilia whitish ochreous, with a slight shade along their base near the apex. *Exp. al.*, 18 mm. *Hindwings* brownish grey, with whitish cilia, shaded at their base. *Abdomen* greyish fuscous, anal tuft whitish ochreous. *Legs* whitish.

Type. ♂. Mus. Wlsm.

Hab. Colorado—Loveland, 5,000 ft., July, 1891 (Smith).

Several specimens of this species which appears to be allied to *S. corculana*, Z.

Semasia obliterana, sp. n. (Pl. XII., fig. 15.)

Antennæ white, faintly annulated. *Palpi*, *Head*, and *Thorax* milk white. *Forewings* milk white; an elongate grey spot below the fold at one-fourth, and a patch of grey scales at the outer end of the cell, occasionally preceded by longitudinal grey streaks, beyond this some lines of grey scales extend outwards to the apical margin below the apex, terminating in an oblique streak of ferruginous and black scaling connected with a grey shade in the cilia and enclosing a small ochreous patch, above which the apex and apical cilia are pure white, as is the whole costal fourth of the wing, with the exception of a series of grey dots along the extreme margin and two short streaks before the apex; the ocelloid patch is shining white containing transverse lines of ferruginous and black scales sometimes only faintly indicated; opposite to this the apical margin and cilia are thickly speckled with grey, the spaces above and below being white, with the exception of two smaller grey patches at the anal angle. *Exp. al.*, 31 mm. *Hindwings* brownish grey; cilia white, with a faint shade along their base. *Abdomen* brownish grey. *Legs* white.

Type. ♂. Mus. Wlsm.

Hab. Arizona (Morrison, 1883), Colorado—Larima Co., 5,000 ft., June, July, and August, 1891 (Smith).

In some specimens there is more sprinkling of grey scales over the white ground-colour than in others, tending always to assume the form of diffused longitudinal streaks, the ochreous subapical patch is sometimes diffused downwards giving a slight ochreous shade beneath it.

Since writing the above description from the Arizona specimens I have seen others from Colorado (collected by Smith) which have a slight ochreous hue over the forewings and a ferruginous brown dash near the base, below and parallel to the fold, the dark marginal dots are more distinctly expressed as is also the darkening of the cilia.

Allied to *Semasia elongana*, Wlsm., but lacking the dorsal streak and the white dividing line in the cilia of the forewings, it is also lighter in colour.

Semasia transversa, sp. n. (Pl. XII., fig. 16.)

Antennæ cinereous. *Palpi* triangular, projecting more than twice the length of the head beyond it, the apical joint completely concealed in long projecting scales; pale cinereous, whitish above. *Head* creamy-white. *Thorax* pale olive-brown. *Forewings* pale olive-brownish, with white transverse fascia and outer patches (I take the darker shade as the ground-colour for convenience of description, but it would perhaps be equally correct to describe the wing as white, with olive-brown basal patch and central fascia); the white fascia commences before the middle of the costal margin, is contracted at the upper edge of the cell, and dilated below the cell to the dorsal margin, bulging on its outer edge along the fold; beyond the middle of the costa is an outwardly oblique white patch, sometimes divided at its upper end by a small olivaceous line or spot, this is contiguous at its outer edge to a waved white band, enclosing a triangular spot of the dark ground-colour on the costal margin, and extending nearly to the apex, on its lower portion is an olivaceous shade; beneath these two marks and sometimes touching the extremity of the first one—the rounded ocelloid patch, internally olivaceous, contains sometimes a few black scales, but no black transverse streaks; the margins of these three markings are narrowly shining white, and between and around them are some dark umber-brown scales, a patch of the same lying on the

fold before the central fascia ; cilia white at the base, with lines of olivaceous scales throughout from apex to anal angle. *Exp. al.*, ♂ 26 mm. ; ♀ 23 mm. *Hindwings* brown-grey, cilia whitish, with a grey shade and basal line. *Abdomen* brownish grey. *Legs* pale cinereous.

Type. ♂ ♀. Mus. Wlsm.

Hab. Colorado—Loveland, July and September, 1891 (Smith).

A series of this species shows it to be extremely variable in the intensity, and sometimes in the precise form of the markings, some specimens having three instead of two triangular costal spots before the apex. It is nearly allied to *Semasia tarandana*, Mschl., but that species, which is from Labrador (Mschl.) and Oregon (Fern.), differs in its much less clearly defined markings, and in the absence of a clearly indicated patch, this can be traced only in a dark spot on the fold corresponding to the patch of umber-brown scales before the central fascia, described in the present species, but which in *tarandana* appears completely isolated instead of being connected by the dark ground-colour with the dorsal margin ; nevertheless, it is possible (although Dr. Fernald informs me that he regards this species as new) *transversa* may prove to be the southern form of the insect described by Möschler.

ZEIRAPHERA, Tr.

TYPE. *Tortrix corticana*, Hb. (= *communana*, Crt.)

Zeiraphera, Tr. Schm. Eur., VII., 231-2 (1829) ;

Crt. Guide (1 edn.), 168-9 (1831) : (2 edn.) 197

(1837) : Br. Ent., XV., Pl. 711 (1838) ; Stph.

List Br. An. BM., X., Lp. 43 (1852).

= * *Steganoptycha*, Wilk., Stgr. and Wk. Cat. ; Fern. (nec Stph.)

As I have already pointed out in the "Entomologist's Monthly Magazine," Vol. XXXI., p. 43 (1895), Stephens, Ill. Lp. Br. Ins. Haust., IV., 105 (1834), characterises his genus *Steganoptycha* [originally published, Cat. Br. Ins., II., 176-7 (1829)] in the following words: "The males of this genus, at least in the typical species, are well characterized by the peculiar process of hairs, which, during repose, lies concealed beneath the reflected base of the anterior wings." Westwood specified the type in

1840 (Syn. Gen. Br. Ins. 107), as *nisella*, Cl. (= *bæberana*, F., Westw.). Those authors who have subsequently followed Wilkinson [Br. Tortr., 127-8 (1859)] in restricting the genus to species not possessing the costal fold, have succeeded in eliminating from it *all* the species originally included by Stephens, whether typical or otherwise. For the form which I have here to describe *Zeiraphera* is the oldest name and its type *corticana*, Hb., agrees with it in structure, but those who desire to follow Mr. Meyrick in including *wæberiana*, Schiff., in the genus to which this species belongs would be justified in using the name *Enarmonia*, Hb., of which *wæberiana* is the type.

Zeiraphera medioplaga, sp. n. (Pl. XII., fig. 18.)

Antennæ (broken). *Palpi* greyish white, apical joint touched with fuscous. *Head* and *Thorax* greyish. *Forewings* whitish, with some silvery waved lines around the darker margins; these consist of a dark reddish fuscous blotch, touching the costal margin beyond the middle and extending obliquely downwards to the outer and lower margins of the cell, where it is considerably dilated, and is nearly joined by a broad ferruginous streak from the apex, a branch of which also narrowly follows the apical margin; a grey shade extends from the base along the costal portion of the wing, reaching to, and slightly blending with the median blotch; a few small greyish spots along the costa before the apex and a faint ochreous tinge over the pale ground-colour on the apical portion of the wing; cilia whitish, with a strong fuscous dividing line which extends round the apex but does not reach the anal angle. *Exp. al.*, 14.5 mm. *Hindwings* pale greyish, with paler cilia, in which is a grey dividing shade. *Abdomen* pale greyish.

Type. ♂. Mus. Wlsm.

Hab. Colorado—Lee's Cabin, Micawber Mine (Custer Co.), August 7th, 1889. A single specimen received from Mr. T. D. A. Cockerell.

EUCELIS, Hb.

TYPE. *Pyralis aurana*, F. (= *mediana*, Hb.)

Eucelis, Hb., Verz. bek. Schm., 394 (1826); † *En-celis*, Stph., Ill. Br. Ent. Haust., IV., 105 (1834); † *Eucelia*, H.-S. Schm. Eur., IV., 131, 177 (1848); *Eucelis*, Stph. List. Br. An. B. M. X., Lp., 60 (1852); † *Eucelia*, Lah. Fn. Suisse.

- Tortr., 36 (1858); *Eucelis*, Wilk., Br. Tortr., 199-200 (1859); Stn. Man., II., 242 (1859).
 = *Trycheris*, Gn., Ind. Meth., 56 (1845).
 = §*Grapholitha*, Tr. (*Grapholita*, Tr., 1829, emend. 1830), Hein., Fern.

This genus, created by Hübner to include one species only, *aurana*, F., may fairly be taken to cover a much larger field. *E. aurana* is placed by recent authors in the genus *Grapholitha*, Tr., as restricted by Heinemann (Schm. Deutsch. Tortr., 177), but this very familiar name was preoccupied by Hübner [Verz. bek. Schm., 242-3 (ante 1826), type *rizolitha*, Schiff., Hb., teste Sph.] for a section of the *Noctuidæ*, and requires a substitute. Treitschke ignored, or possibly never saw Hübner's work. The type of his genus *Grapholitha* (*Grapholita*, Tr., 1829, emend. 1830), following Curtis' restriction of 1831, became fixed as *dorsana*, F., by Lederer, in 1859, when he eliminated from Treitschke's section B the species included in the new genus *Phthoroblastis*, Ld., and referred *petiverella* and its congeners to *Dichrorampha*.

No! Hübner's name is *Grapholitha* 1826

Duponchel [Hist. Nat. Lp. Fr., IX., 22, 263-5 (1834)] cited *nisella*, Cl. (= *petrana*, Dp.) as the type of *Grapholitha*, but this species was not originally included by Treitschke and could not therefore have been his type; he overlooked also Curtis' restriction of the genus to Treitschke's section B, adopting the name for section A, in which he was followed by Stephens, Wilkinson, and Stainton.

Grapholitha has been used in Staudinger and Wocke's Catalogue in a still wider sense to include subgenera which possess the costal fold. In any case another name must be adopted for this genus on account of its pre-occupation, and also because all or nearly all the species included in it had previously received other generic names.

Without attempting clearly to define the range of the genus *Grapholitha*, Tr. (Hein.), which may yet be capable of subdivision under other of the older names, I have here substituted for it the Hübnerian name *Eucelis*.

The family name *Grapholithinæ*, Fern., must certainly share a similar fate, but taking *arcuella*, L., as perhaps more clearly typical of the majority of genera included in the *Trichophoridæ* (as representing the group of *Tortricidæ* which possesses hair on the upper edge of

the median vein near the base), I would suggest the adoption of *Olethreutinæ* corrected from *Olethreutæ*, Hb. (Tentamen), the family in which he placed his genus *Olethreutes*, which dating from 1806, I believe to be the oldest family name adopted for any species now classed with the *Grapholithinæ*, its type being *Olethreutes arcuella*.

Anticipating criticism on the ground of inconsistency, I may add that the manner in which Treitschke ignored Hübner's earlier work will render revision of his generic names absolutely necessary whenever the whole subject of the classification of the *Tortricidæ* and *Tineidæ* comes to be dealt with, but with respectful regard for conservative prejudices on both sides of the Atlantic, we may leave *Semasia*, *Pædisca*, and *Penthina*, as used in this paper on respite to come up for judgment when called upon. I have almost abandoned the hope that my friend Dr. Fernald will carry out his old intention of dealing with this subject in a comprehensive manner.

Eucelis larimana, sp. n.

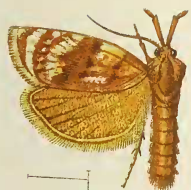
Antennæ hoary greyish. *Palpi* recurved, somewhat slender, the apical joint very small; hoary greyish. *Head* hoary grey. *Thorax* greyish fuscous, with some hoary speckling, the ends of the tegulæ whitish. *Forewings* greyish fuscous, with minute hoary white speckling; a series of oblique hoary streaks along the costal margin, those before the middle being geminated, four or five beyond the middle single and whiter than the others; the third streak from the apex sends out a grey line to the cilia below the apex, interrupting a distinct black line which runs along their base; a reduplicated oblique white patch rests on the middle of the dorsal margin and is somewhat diffused along it towards the base; some white and steel grey mottling around the ocelloid patch which contains three black partially interrupted lines; cilia shining bronzy grey, with a black line along their base. *Exp. al.*, 14.5 mm. *Hindwings* grey brown, with whitish cilia, a brown line running through them near their base. *Abdomen* greyish fuscous. *Legs* white, tarsi faintly banded above.

Type. ♂. Mus. Wlsm.

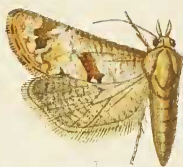
Hab. Colorado—Loveland, 5,000 ft., June, 1890-91 (Smith).

EXPLANATION OF PLATE XII.

[See Explanation facing PLATE XII.]



1.



2.



3.



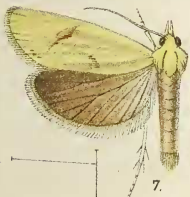
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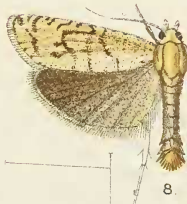
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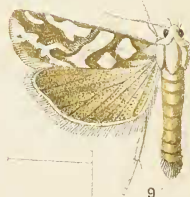
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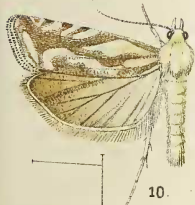
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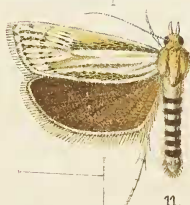
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9.



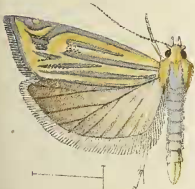
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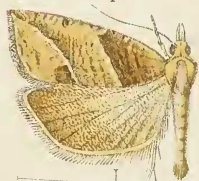
11.



12.



13.



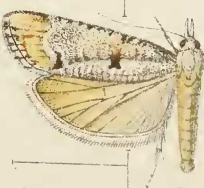
14.



15.



16.



17.



18.

W. Frohawk del. A. J. Wendel lith

F. W. M. Trap Chromo